

CLAIMS

We claim:

1 1. A method for noninvasive screening of a human eye for the presence of a
2 ferromagnetic foreign body, said method comprising:
3 providing at least one magnetic sensor, and means for processing sensed signals
4 from said at least one magnetic sensor;
5 positioning said magnetic sensor in proximity to an eye of the patient;
6 applying a magnetic field to said eye;
7 moving at least one eye of the patient;
8 sensing a plurality of responses from said eye with said magnetic sensor, at a
9 plurality of gaze orientations; and
10 outputting data corresponding to the magnetic susceptibility of a ferromagnetic
11 foreign body within said eye.

1 2. The method recited in claim 1, wherein said outputting of data
2 corresponding to magnetic susceptibility comprises outputting of data corresponding to
3 the size of a ferromagnetic foreign body within said eye.

1 3. The method recited in claim 1, wherein said outputting of data
2 corresponding to magnetic susceptibility comprises outputting of data corresponding to
3 the location of a ferromagnetic foreign body within said eye.

1 4. The method recited in claim 1, further comprising moving said at least one
2 eye of the patient from side to side.

1 5. The method recited in claim 1, further comprising moving said at least one
2 eye of the patient up and down.

1 6. The method recited in claim 1, further comprising moving said at least one
2 eye of the patient in a predetermined pattern.

1 7. The method recited in claim 6, further comprising:
2 providing a gaze fixation target visible to said eye of the patient;
3 moving said gaze fixation target in said predetermined pattern; and
4 following said gaze fixation target with said eye of the patient.

1 8. The method recited in claim 6, further comprising:
2 providing a plurality of gaze fixation targets visible to said eye of the patient;
3 arranging said plurality of gaze fixation targets in said predetermined pattern; and
4 sequentially gazing at each of said gaze fixation targets, in a predetermined order,
5 with said eye of the patient.

1 9. The method recited in claim 1, further comprising:
2 positioning said magnetic sensor in proximity to a first eye of the patient;
3 providing a gaze fixation target visible to a second eye of the patient;
4 moving said gaze fixation target in a predetermined pattern; and
5 following said gaze fixation target with said second eye of the patient.

1 10. The method recited in claim 1, further comprising:
2 positioning said magnetic sensor in proximity to a first eye of the patient;
3 providing a plurality of gaze fixation targets visible to a second eye of the patient;
4 arranging said plurality of gaze fixation targets in a predetermined pattern; and
5 sequentially gazing at each of said gaze fixation targets, in a predetermined order,
6 with said second eye of the patient.

1 11. The method recited in claim 1, further comprising moving said at least one
2 eye of the patient in a random fashion.

1 12. The method recited in claim 1, further comprising providing a magnetic
2 sensor which functionally operates at room temperature and minimizes noise due to
3 temperature fluctuations at said magnetic sensor.

1 13. The method recited in claim 12, further comprising:
2 providing an applied field source; and
3 applying said magnetic field with said applied field source.

1 14. The method recited in claim 13, wherein said applied field source includes
2 an applied field coil, and further comprising supplying current to said applied field coil to
3 generate said magnetic field.

1 15. The method recited in claim 14, wherein said supplying of current
2 comprises supplying alternating current to said applied field coil.

1 16. The method recited in claim 14, wherein said supplying of current
2 comprises supplying direct current to said applied field coil.

1 17. The method recited in claim 13, wherein said applied field source includes
2 a permanent magnet, and further comprising positioning said permanent magnet in
3 proximity to said patient to apply said magnetic field.

1 18. The method recited in claim 12, further comprising:
2 mounting said at least one magnetic sensor in a head mounted display; and
3 rejecting any spurious magnetic signals caused by motion of said head mounted
4 display with respect to any ambient magnetic field.

1 19. The method recited in claim 1, further comprising providing a SQUID
2 magnetic susceptibility detection system.

1 20. The method recited in claim 19, further comprising:
2 providing an applied field source; and
3 applying said magnetic field with said applied field source.

1 21. The method recited in claim 20, wherein said applied field source includes
2 an applied field coil, and further comprising supplying current to said applied field coil to
3 generate said magnetic field.

1 22. The method recited in claim 21, wherein said supplying of current
2 comprises supplying direct current to said applied field coil.

1 23. The method recited in claim 20, wherein said applied field source includes
2 a permanent magnet, and further comprising positioning said permanent magnet in
3 proximity to said patient to apply said magnetic field.

1 24. The method recited in claim 1, further comprising:
2 providing a flexible container holding a deformable material whose magnetic
3 susceptibility properties approximate those of human tissue; and
4 placing said flexible container between said magnetic sensor and said eye of the
5 patient.

1 25. The method recited in claim 1, further comprising:
2 providing a plurality of said magnetic sensors at a plurality of remote locations;
3 providing a central computer processing station;
4 positioning each said remote magnetic sensor in proximity to an eye of a patient;
5 applying a magnetic field to each said eye;
6 moving each said eye and sensing the magnetic susceptibility responses with an
7 associated magnetic sensor, at a plurality of gaze orientations;
8 transmitting said plurality of magnetic susceptibility responses to said central
9 computer processing station via a communication system; and
10 interpreting said magnetic susceptibility responses with said central computer
11 processing station.

1 26. The method recited in claim 25, further comprising transmitting said
2 plurality of said magnetic susceptibility responses to said central computer processing
3 station via the Internet.

1 27. The method recited in claim 25, further comprising providing real-time
2 interactive feedback between said remote source-sensor units and said central computer
3 processing station.

1 28. The method recited in claim 25, further comprising performing
2 instantaneous autointerpretation of said magnetic susceptibility responses using artificial
3 intelligence.

1 29. The method recited in claim 25, further comprising performing
2 instantaneous autointerpretation of said magnetic susceptibility responses using a neural
3 network.